
Photo Credit LaPorte Properties

Barriers to Solar Energy

Utah Renewable Energy Initiative Stakeholder Group

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Overview

Benefits of Solar

Utah's Solar Resource

Barrier and Policy Information from the U.S. Department of Energy, Solar America Initiative for both Photovoltaic and Concentrating Solar Power (CSP)

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Benefits of Solar

- Provides inexhaustible electricity
- Provides valuable peak power
- Can be easily installed within our high-load transmission constrained areas
  - Short Construction Periods
  - Easy to Site (No Air Permit, Little/No NIMBY)
- Renewable resources recognized in PacifiCorp's IRP as a means to mitigate fuel volatility and environmental risk

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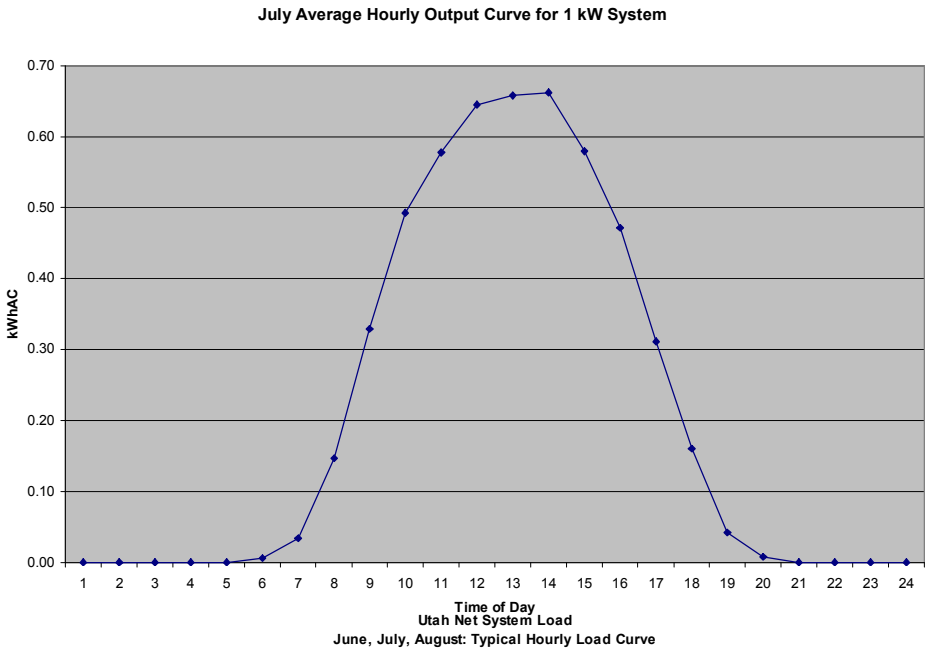
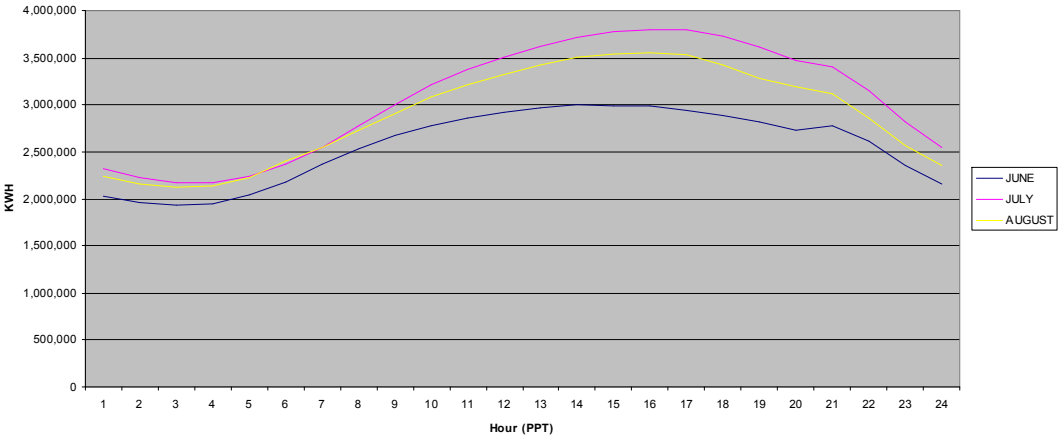
Characteristics of Utah Solar Resource and Benefits to Utah System

Photovoltaic Solar Output Mountain Time

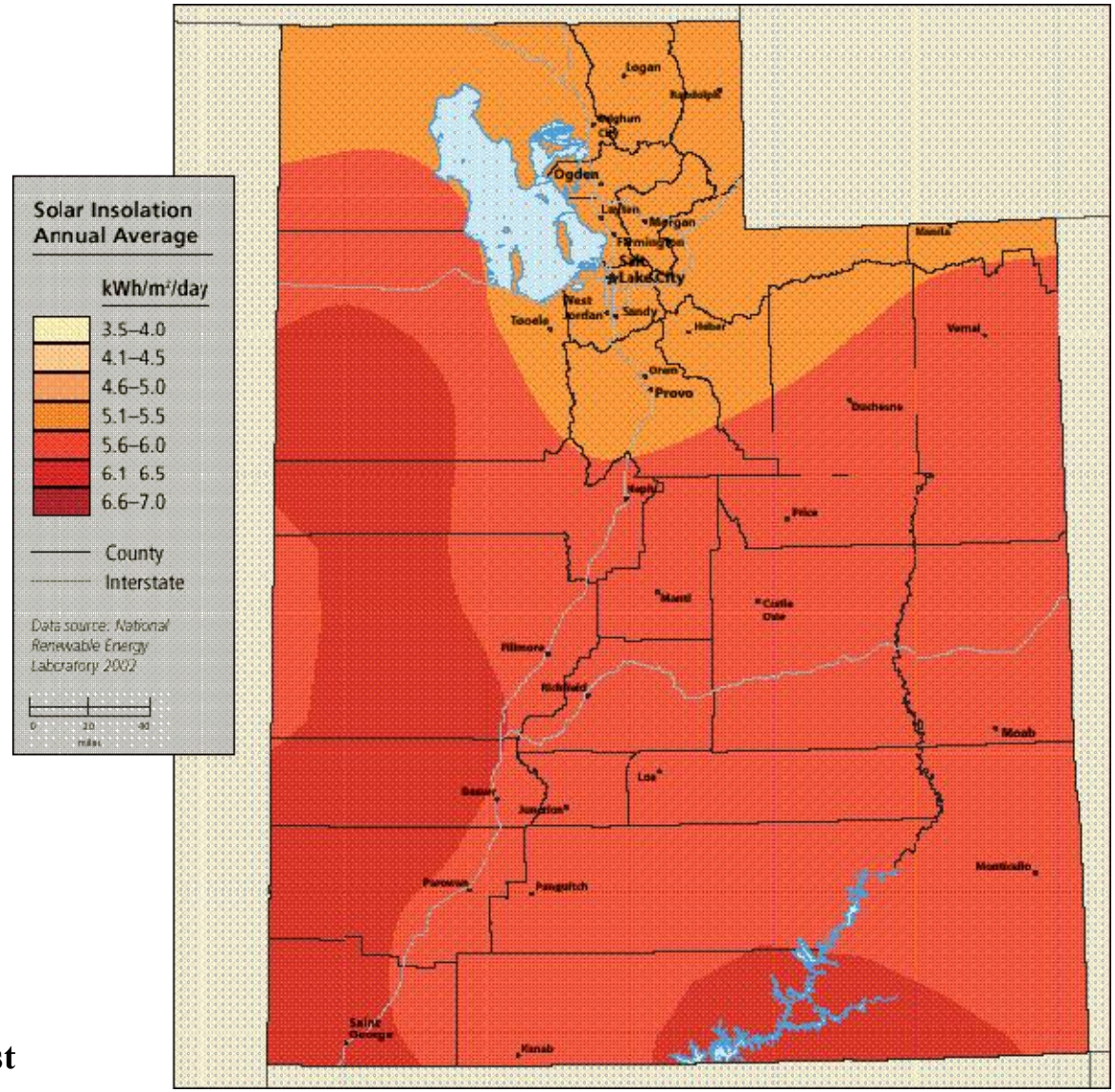


Utah's load shape Pacific Time



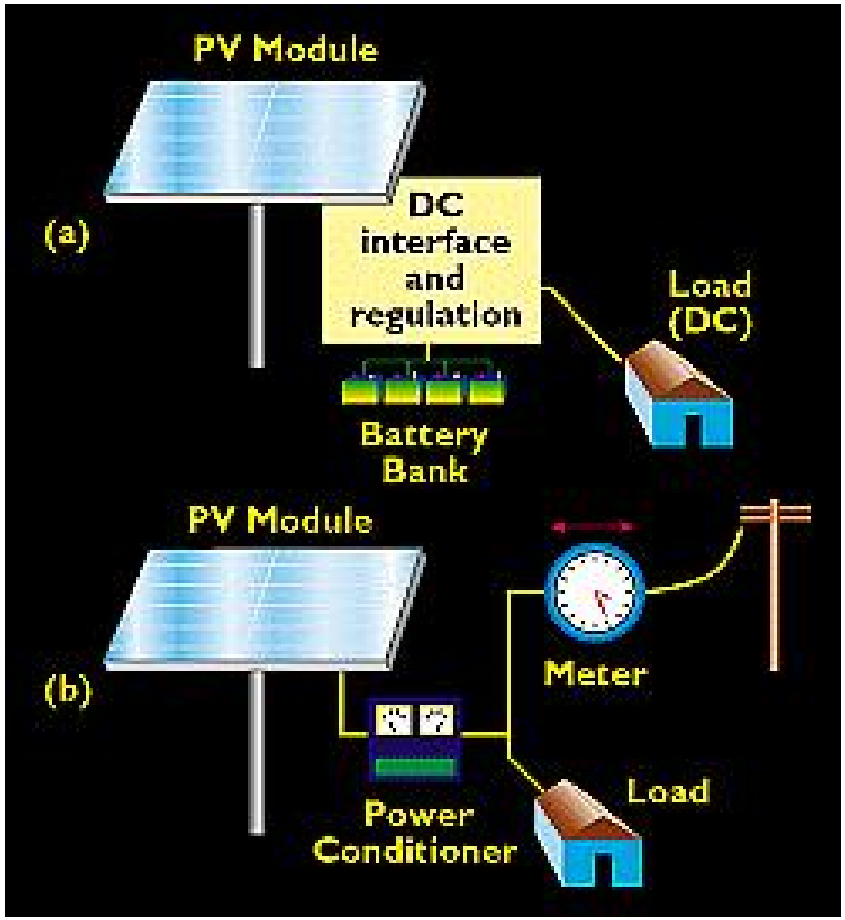
Utah's Solar Resource

- Utah has an excellent solar resource
- In the top 4 or 5 in nation
- Potential for 69 million MW hours/year
- High coincidence between output and load



Source: Renewable Energy Atlas of the West

Solar PV 101



Credit DOE/NREL

- PV technology converts sunlight directly into electricity.
- Works any time the sun is shining (more electricity produced on sunny days)
- PV produces electricity directly from the electrons freed by the interaction of sunlight with semiconductor materials in the PV cells.
- For more information, visit www.nrel.gov

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Solar America Initiative

Market Transformation

DOE Solar Energy Technologies Program

Solar America Cities

Activity Objectives:

- Partner with cities committed to achieving a sustainable solar infrastructure through a comprehensive, city-wide approach to solar technology that facilitates mainstream adoption and provides a model for other cities to follow.

Project Overview

- The selected cities will receive a combined $2.5 M in DOE funding plus substantial hands on assistance in their plans to:
  - Integrate solar technologies into city energy planning, zoning and facilities
  - Streamline city-level regulations and practices that affect solar adoption by residents and local businesses – including permitting, inspections, local codes
  - Promote solar technology among residents and local businesses through outreach, curriculum development, incentive programs, and other innovative approaches
- To ensure maximum impact, cities were required to submit a letter of support from their mayors and local utilities.

FY 2007 Solar America Cities

The 13 Solar America Cities selected in 2007 are:

- Ann Arbor, MI
- Austin, TX
- Berkeley, CA
- Boston, MA
- Madison, WI
- New Orleans, LA
- New York, NY
- Pittsburgh, PA
- Portland, OR
- **Salt Lake City, UT**
- San Diego, CA
- San Francisco, CA
- Tucson, AZ

Eight are among the largest 50 cities in the U.S.

Solar America Cities are located in 11 states.

SAI market transformation activities address two broad objectives

Reduce barriers to the commercialization of solar energy technologies

- Support the development of codes and standards that facilitate the installation of solar technologies
- Improve grid integration and net metering practices
- Provide information and best practices to state government officials
- Support a trained workforce able to meet future increases in solar technology demand

Promote market expansion of solar energy technologies

- Build partnerships with cities to aggressively promote solar technologies within national electricity load centers.
- Support the installation of novel solar technologies into replicable large-scale high visibility solar installations.

Market barriers increase the price of solar systems and the time to commercialization. Market transformation activities reduce costs and time, resulting in widespread deployment.

DOE identified significant market barriers to solar technology commercialization

- Lack of communication, information dissemination, and consumer awareness
- Inadequate codes and standards
- Lack of appropriate, consistent interconnection standards
- Lack of equitable and effective net-metering guidelines
- Inconsistent utility rate structure practices
- Complex permitting procedures and fees
- Inconsistent and lack of widespread incentives and other drivers
- Limited education/experience of key building trades with solar technology
- Lack of trained technical personnel, reliable installers, and maintenance services
- Lack of flexible, sophisticated, proven financial approaches

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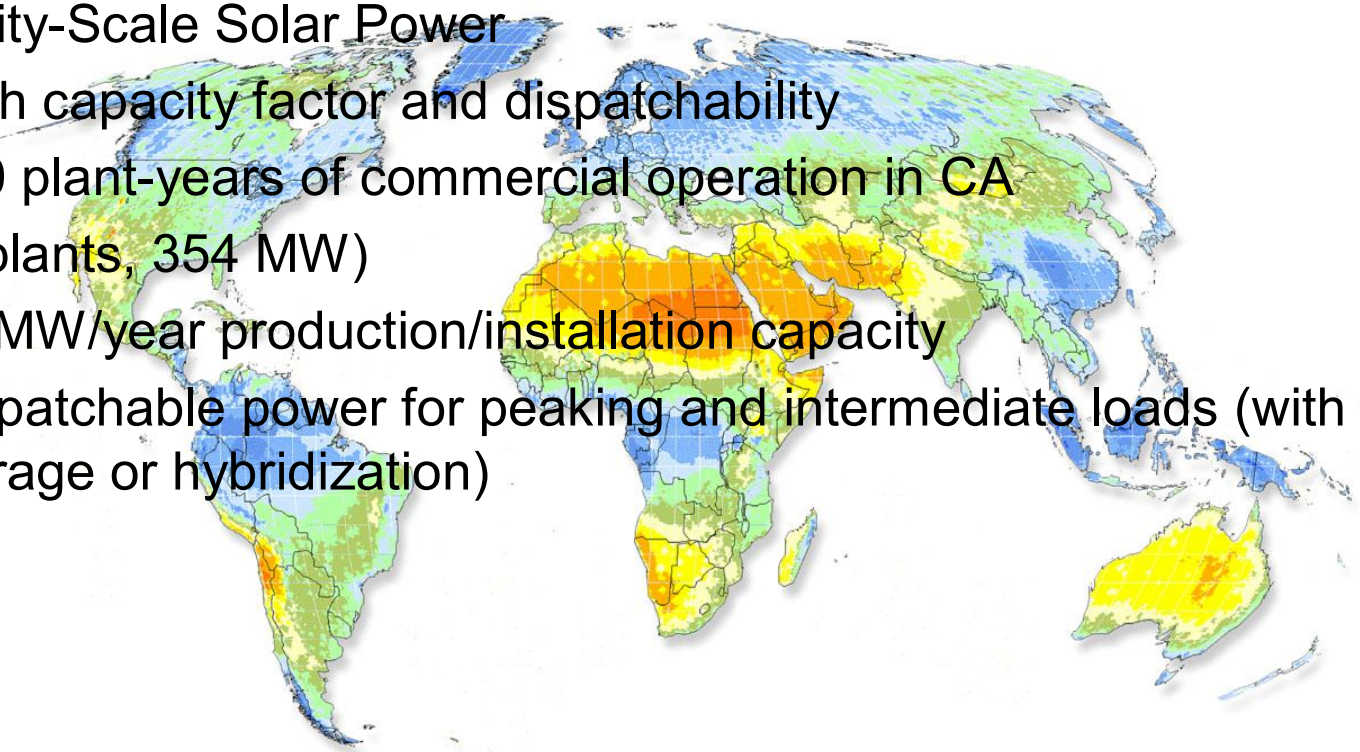
What is Concentrating Solar Power (CSP)?

Solar concentration allows tailored design approaches for central and distributed power generation.

***Also known as Solar Thermal Electric Power**

What can CSP do?

- Concentrating Solar Power has demonstrated:
  1. Utility-Scale Solar Power
  2. High capacity factor and dispatchability
  3. 130 plant-years of commercial operation in CA
     (9 plants, 354 MW)
  1. 80 MW/year production/installation capacity
  2. Dispatchable power for peaking and intermediate loads (with storage or hybridization)



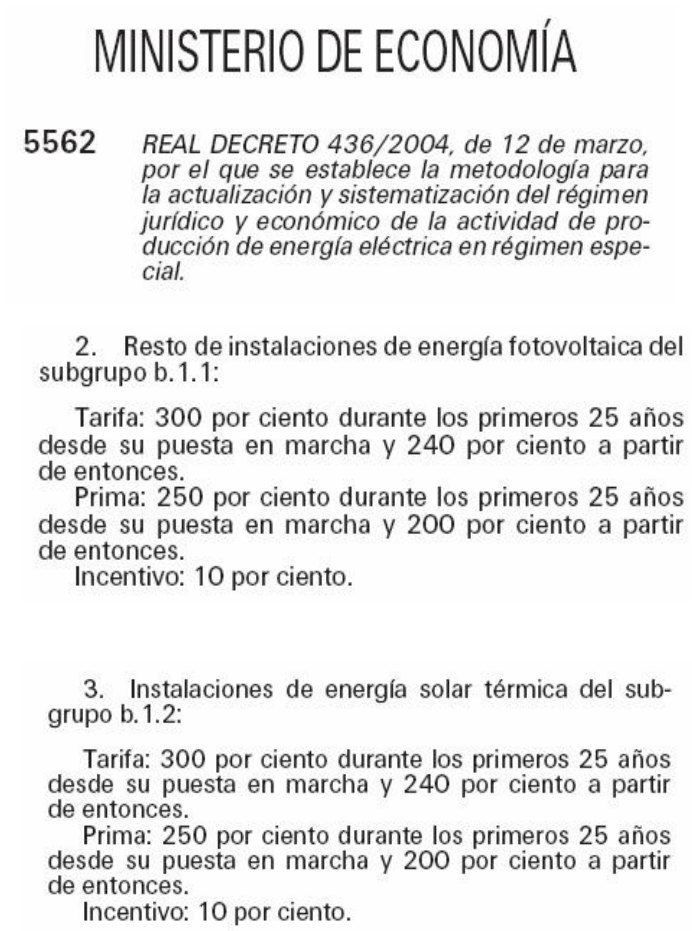
WGA ACTIVITY

1. *Outcomes: Recommendations*
2. Extend the 30% Federal ITC
3. Exempt sales and property taxes
4. Allow longer-term Power Purchase Agreements
5. Encourage State PUCs, utilities, and project developers to seek means for aggregating plant orders

Incentives for CSP

1. Federal Incentive:
    1. Investment Tax Credit of 30% through end of 2008 (working on an extension; House passed Bill)
    2. Loan guarantee program
2. State Incentives:
    1. Renewable Portfolio Standards
    2. Solar “set asides”
    3. State production tax credits
    4. Property and sales tax relief
    5. Possible state loan guarantee programs

New Spanish Feed-In Law for CSP: Real Decreto 436/2007



MINISTERIO DE ECONOMÍA

5562 *REAL DECRETO 436/2004, de 12 de marzo, por el que se establece la metodología para la actualización y sistematización del régimen jurídico y económico de la actividad de producción de energía eléctrica en régimen especial.*

2. Resto de instalaciones de energía fotovoltaica del subgrupo b.1.1:

Tarifa: 300 por ciento durante los primeros 25 años desde su puesta en marcha y 240 por ciento a partir de entonces.
Prima: 250 por ciento durante los primeros 25 años desde su puesta en marcha y 200 por ciento a partir de entonces.
Incentivo: 10 por ciento.

3. Instalaciones de energía solar térmica del subgrupo b.1.2:

Tarifa: 300 por ciento durante los primeros 25 años desde su puesta en marcha y 240 por ciento a partir de entonces.
Prima: 250 por ciento durante los primeros 25 años desde su puesta en marcha y 200 por ciento a partir de entonces.
Incentivo: 10 por ciento.

- Grants same tariffs for PV and CSP from 100kW to 50MW
- Cost covering with up to 0.27 Euro/kWh (~$0.37/ kWh)
- Bankable with 25 year guarantee
- Annual adaptation to electricity price escalation
- 12-15% natural gas backup allowed to grant dispatchability and firm capacity
- Plant size limited to 50 MW each
- After implementation of first 500MW tariff will be revised for subsequent plants

Spanish CSP Feed-In Law Boosts CSP Projects

- Within 3 months after publication of RD436 (2004), half a dozen new CSP projects started development
- The new contractors are willing to take the risk of full EPC guarantees
- High interest of investors from utility sector to participate in equity
- Competition of commercial banks for financing
- New players ready to offer in GEF projects, since now they see a home market

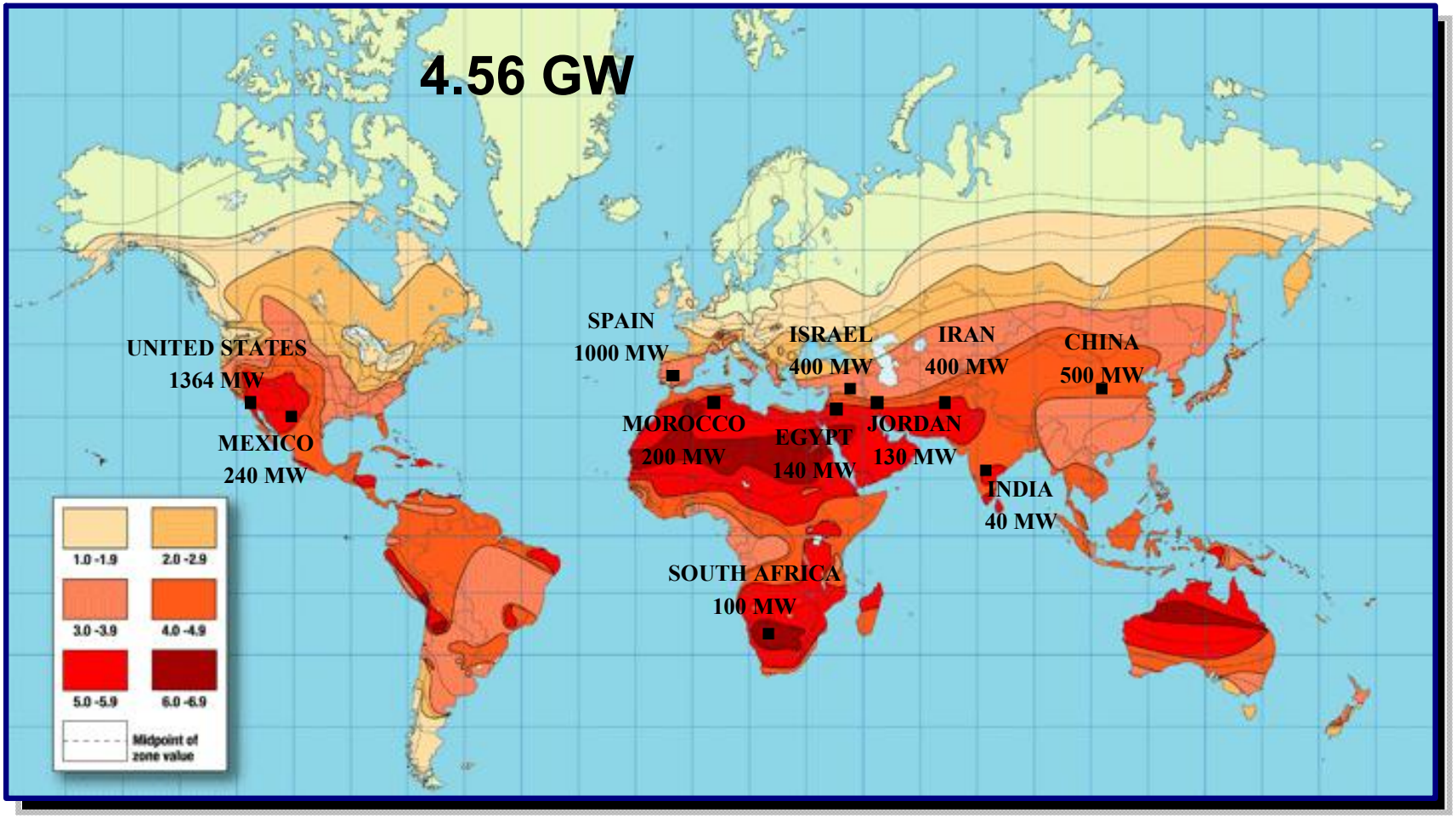
Projects in Southwestern U. S.

1. 1 MW trough/ORC in Arizona (APS, Solargenix) operating
2. 64 MW trough electric project in Nevada (Nevada Power, Solargenix) commissioned June 2007
3. 500 (option to 850 MW) Dish Stirling plant in Southern California (SCE, SES). (Agr. signed Aug 2005.)
4. 300 (option to 900 MW) of Dish Stirling plants in Southern CA (SDG&E, SES). (Agr. signed in Sep 2005.)
5. PG&E 553MW (PPA w/Solel) (July 23, 2007)
6. ~ 250 MW SW Utility Consortium in planning
7. Other RFPs issued by not announced (SCE, PG&E, LADWP, SMUD, SDG&E, APS, etc.)

Projects Around the World

1. Algeria: Abener, 30 MW trough fuel saver; €75M and it must provide 5% solar fraction annually.
2. Egypt: Bids for the 150 MW Kuraymat trough plant are due November 2006.
3. South Africa: ESKOM in Phase V of molten-salt power tower development; currently performing an EIA.
4. Israel: SOLEL signed a contract for a 150 MW trough plant.
5. Mexico: Bids expected in December 2006 for the 30 MW solar trough project at Agua Prieta in Sonora.
6. Spain: Estimates are that 2 GW or more of CSP plants are in the planning stages. SOLUCAR started operation of PS 10 power tower and construction of the 20 MW PS 20; the first of three 50 MW ANDASOL trough plants with 7.5 hours of molten-salt thermal storage is under construction.

CSP Worldwide Deployment Plans



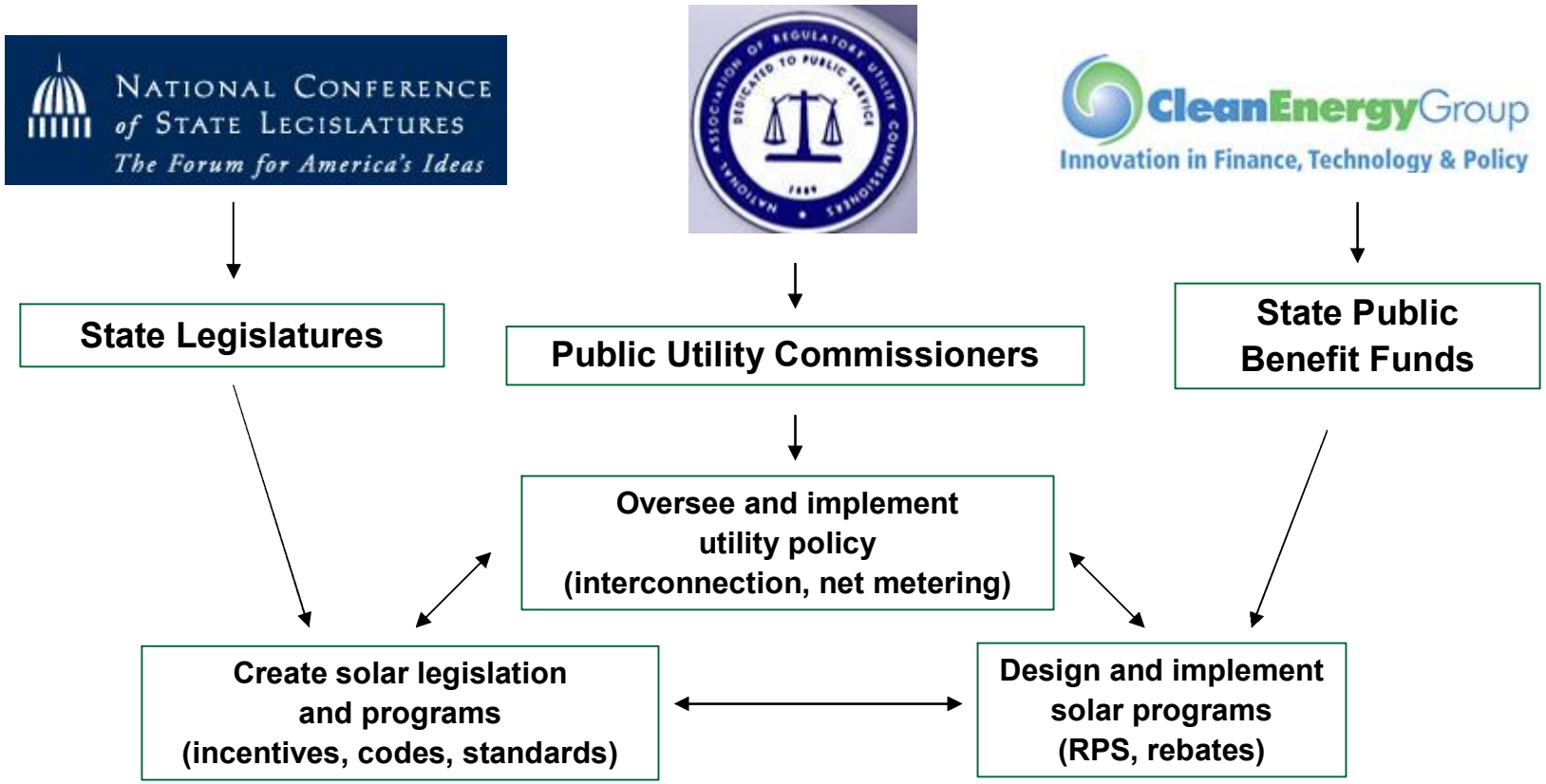
State Technical Outreach

Winners: National Conference of State Legislatures
Clean Energy Group
National Association of Regulatory Utility Commissioners

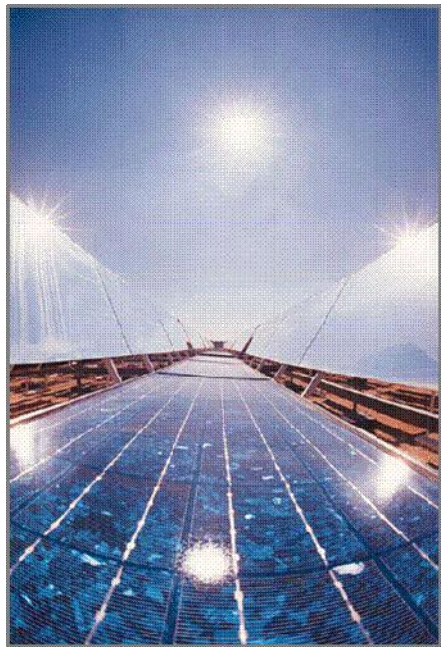
Activity Objectives:

- Build relationships with State decision-makers (such as State legislatures, energy offices, public utility commissions and air quality offices) responsible for enacting policies, programs, and plans that are key drivers for solar technology market transformation.
- Provide key state actors with solar best practices and up-to-date, accurate information about solar technology, so they are positioned make informed solar policy decisions

National Conference of State Legislatures
Clean Energy Group
National Association of Regulatory Utility Commissioners



Questions?



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